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10/541,362	04/13/2006	Alexandre Laurent	274802US0XPCT	3252
22850 7590 03/01/2010 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER PALENIK, JEFFREY T				
ART UNIT		PAPER NUMBER		
1615				
NOTIFICATION DATE		DELIVERY MODE		
03/01/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/541,362

**Applicant(s)**

LAURENT ET AL.

**Examiner**

Jeffrey T. Palenik

**Art Unit**

1615

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/GS/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### **STATUS OF THE APPLICATION**

Applicants' amendments and remarks filed 3 November 2009 are acknowledged and entered on the record. The Examiner acknowledges the following:

No claims have been added.

Claims 18 and 19 are cancelled.

Claims 1-17 and 20 have all been amended to clarify the language and to correct the issue of improperly dependent claims (e.g. claims 6-17). As such, no new matter is considered to have been added.

Thus, claims 1-17 and 20 now represent all claims currently under consideration.

### **INFORMATION DISCLOSURE STATEMENT**

No new Information Disclosure Statements (IDS) have been submitted for consideration.

### **WITHDRAWN OBJECTIONS/REJECTIONS**

#### Objection to the Specification

Applicants' submission of a new Abstract to the Invention is sufficient enough to render **moot** the objection.

#### Objection to the Claims

Applicants' amendments to claims 6-17 is sufficient enough to overcome the objection made concerning the claims being improperly dependent. The objection is **withdrawn**.

Rejection under 35 USC 112

Applicants' amendment to claim 1 removing the limitation reciting "injectable" is sufficient enough to render **moot** the rejection.

Rejections under 35 USC 102 and 103

Applicants' remarks concerning the both the rejections to claims 1-4 and 20, under 35 USC 102(b), as being anticipated by Nakashio et al. (USPN 4,029,616) as well as to claim 5, under 35 USC 103(a), as being unpatentable over Nakashio et al., have been fully considered and are sufficient enough to render the rejection moot. Thus, said rejection has been **withdrawn**.

**MAINTAINED REJECTIONS**

The following rejections are maintained from the previous Office Correspondence dated 7 August 2008 since either the grounds or art on which they were previously set forth continues to read on the amended limitations.

**CLAIM REJECTIONS - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 20 is rejected under 35 U.S.C. 102(b) as being anticipated by Bajaj et al. (*Journal of Polymer Science: Polymer Chemistry Edition*).

Bajaj et al. teach the copolymerization of acrylonitrile (AN) with 3-chloro, 2-hydroxy-propyl methacrylate (CHPMA) into a either a solution or a suspension using either of the water-miscible solvents: de-ionized water or de-ionized water/acetone (see Synopsis, Introduction and Copolymerization).

#### **RESPONSE TO ARGUMENTS**

Applicants' arguments with regard to the rejection of claim 20 under 35 USC 102(b) as being anticipated by Bajaj et al., has been fully considered, but is not persuasive.

Applicants simply state in traverse of the rejection that "Bajaj does not describe or suggest all of the features of the present claim 20".

In response, the Examiner respectfully **maintains** the rejection on the grounds that Applicants' response does not clearly delineate which of the limitations of the instant invention are not met by the reference. As such, the response, though fully considered, is unpersuasive.

#### **NEW REJECTIONS**

In light of Applicants' amendments to the claims as well as the withdrawn rejections, the following rejections have been newly added:

#### **CLAIM REJECTIONS - 35 USC § 112**

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Pertaining to the components of the composition, claims 13 and 14 each recite that the linear polymer component comprises at least one “hydroxyethyl methacrylate-based” and/ or “hydroxypropyl methacrylate-based” copolymer. Namely, use of the phrase “-based” renders the claims indefinite because the claims include elements not actually disclosed (those encompassed by “-based”), thereby rendering the scope of the claims unascertainable. See MPEP § 2173.05(d).

#### **CLAIM REJECTIONS - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5, 11, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leshchiner et al. (EP 0 466 300 A2).

The amended base claim is directed to a polymer composition wherein solid particles comprised of at least one water-insoluble, hydrophilic crosslinked polymer are suspended in a solution comprising at least one water-insoluble, linear polymer and its solvent. Said solvent is further recited as being a water-miscible solvent. It is interpreted by the Examiner that said solvent is not pure water as the linear polymer is claimed as being water-insoluble. Claims 2 and 3 recite limitations to said linear polymer.

Leshchiner teaches the limitations to claim 1 as the practiced invention is drawn to the production of two-phase gel slurries wherein the first phase comprises swollen, polymeric gel particles which are uniformly distributed in the second phase which is preferably a viscoelastic solution of a polymer (pg. 3, lines 35-38). Polymers which are taught as being used to make the formulations include both water-soluble and water-insoluble synthetic polymers such as copolymers and derivatives of polyacrylic and polymethacrylic acids such as poly(hydroxyethyl) acrylate, poly(hydroxyethyl) methacrylate, poly(hydroxypropyl) acrylate or poly(hydroxypropyl)

methacrylate (pg. 3, lines 48-51). Concerning the “first phase”, as discussed above, Leshchiner further teaches that swollen particles are “insolubilized” by way of crosslinking, the crosslinks being of covalent or ionic nature. The gels of the of the “second phase” or solution phase, are made of polymers which may be solubilized using both aqueous and organic solvents (pg. 3, lines 52-58; pg. 4, line 48 to pg. 5 line 11).

Claim 5 recites that the linear polymer comprises from 3-25% mass per volume of the composition. Claim 11 recites that the water-insoluble, hydrophilic crosslinked polymer is present between 1-30% mass per volume of the composition.

Leshchiner expressly teaches that the concentration of the polymer(s) used in constructing the “gel phase” (i.e. the swollen particle phase) will range as broadly as 0.01-30% and more narrowly and preferably from 0.05-20% (pg. 6, lines 5-8). Regarding the composition of the soluble polymer of the viscoelastic slurry, Leshchiner additionally teaches that the polymer concentration in the soluble phase may be from 0.01-70% and more preferably from 0.2-40% (pg. 6, lines 18-19).

Claim 17 recites that the polymeric composition of claim 1 further comprises one or more adjuvants such as dyes, markers, pharmaceutically active agents such as ant-inflammatory or antimicrobial agents, proteins and peptides.

The teachings of Leshchiner et al. disclose the limitations of the claim teaching that in addition to the two major components, the viscoelastic gel slurry may contain other components such as physiologically active substances (e.g. drugs, in general), and dyes (e.g. markers) (pg. 6,



lines 44-48). It is further taught and suggested that slurry composition may contain adjuvants such as peptides and proteins. Leshchiner teaches that natural polymers of the composition include proteins (e.g. collagen) and nucleic acids (e.g. peptides) (pg. 3, lines 39-47).

Thus, in view of the forgoing teachings, it would have been *prima facie* obvious for a person of ordinary skill in the art to have arrived at the instantly claimed composition. Of particular concern are the structural limitations of the composition, namely a solid polymer phase suspended in a second, soluble polymer phase. This teaching, combined with routine experimentation on the part of the skilled artisan to determine and optimize the polymers used in the composition would have provided a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the reference, alone or in combination, especially in the absence of evidence to the contrary.

Claims 6-10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leshchiner et al. as set forth above with respect to claim 1, as further evidenced by van Bladel et al. (EP 0 826 381 A2).

The limitations to claim 1 are discussed above. Claims 6-10 recite compositional limitations to the water-insoluble, hydrophilic crosslinked polymer. Claim 6 recites product-by-process limitations (MPEP §2113) wherein said crosslinked polymers are obtained from broad polymer categories such as poly(alkyl acrylates) and poly(alkyl methacrylates). Claims 7 and 8 recite similar limitations further specifying that the crosslinked polymer is obtained from water-soluble polymers such as methacrylic polymers, polyacrylamides and polymethacrylamides.

Claim 9 recites that the crosslinked polymer is selected from compounds such as crosslinked hydroxyethyl methacrylate and/or hydroxypropyl methacrylate. Regarding the “degree of crosslinking” limitations recited in claim 10; until some material difference(s) in the properties of the composition are demonstrated, said limitation is considered by the Examiner to be directed toward the composition, which is instantly claimed. Claim 12 recites a particle size for the crosslinked polymer ranging from 1-1,000 microns. Claims 13 and 14 further limit the composition of claim 1 such that the both linear and crosslinked polymers are either a hydroxyethyl- or hydroxypropyl-based methacrylate copolymer(s).

The teachings of Leshchiner are discussed above. Of particular note, is the structural composition taught by Leshchiner and that said swollen insoluble gel particles, which are formed through crosslinking, may be comprised of such synthetic polymers as HEMA and polyacrylamides. The teachings of Leshchiner, as further evidenced by van Bladel, expressly teach and suggest that the swollen hydrogel particles can be prepared by crosslinking polymers such as pHEMA (poly(2-hydroxyethyl methacrylate)) copolymer, a hydrolyzed polyacrylonitrile (HYPAN), a polyacrylic acid copolymer or a polyacrylamides copolymer (pg. 4, lines 28-48). This teaches the limitations of claims 6-10.

The combined teachings also teach and suggest the limitations of claims 13 and 14. Leshchiner, as discussed above, more broadly teaches that the polymers which may be used to form the two-phase gel slurry include those such as copolymers and derivatives of polyacrylamide such as poly(hydroxyethyl methacrylate) or pHEMA (pg. 3, lines 48-51). Teaching of the limitations pertaining to the crosslinked copolymers is discussed above.

Concerning the particle size limitation of the crosslinked, hydrophilic particles, the teachings of van Bladel further provide that particles sized at 25, 50 and 80 microns are not only possible, but preferably prepared to be of at least these sizes (pg. 5, lines 29-31).

Thus, in view of the forgoing teachings, it would have been *prima facie* obvious for a person of ordinary skill in the art to have modified the teachings of Leshchiner in view of those provided by van Bladel in order to arrive at the instantly claimed invention. The ordinarily skilled artisan would have been particularly motivated to make said modification in light of the fact that both references disclose the preparation of hydrophilic, yet insoluble (e.g. swollen) gel particles via crosslinking. Where Leshchiner more broadly teaches that either of its components may be formed using copolymers such as pHEMA, the additional evidence provided by van Bladel shows that the swollen crosslinked particles are favorably made from such polymers as pHEMA.

These teachings, combined with routine experimentation on the part of the skilled artisan to determine and optimize the size of the polymer particles used in the composition would have provided a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the reference, alone or in combination, especially in the absence of evidence to the contrary.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over the teachings of Chang et al. (USPN 5,162,420).

Independent claim 20 is directed to a copolymeric solution comprising a linear copolymer dissolved in at least one biocompatible, water miscible solvent. A further limitation stipulates that where the linear copolymer is a blend of hydroxypropyl methacrylate and acrylonitrile, the solvent used is not dimethyl sulfoxide (DMSO) [*emphasis added*].

The teachings of Chang are directed to aqueous solutions or dispersions containing a solution polymerized from vinyl-type monomers (Abstract). Examples of copolymerizable vinyl-type monomers include both hydroxyalkyl methacrylates such as HPMA as well as unsaturated nitriles such as acrylonitrile, methacrylonitrile and ethacrylonitrile (col. 3, line 55 to col. 4, line 10). Solvents which are taught for preparing said solutions include organic solvents such as lower alkanols containing 2-4 carbon atoms such as ethanol (col. 5, lines 7-15).

It would have been *prima facie* obvious for a person of ordinary skill in the art to have arrived at the instantly claimed solution composition, particularly in view of the forgoing guidance. Based on said teachings, it is further apparent that there would have had been a reasonable expectation of success in producing the claimed invention since the invention is expressly directed to the preparation of a copolymer solution where the solvent is not DMSO and the copolymer may be comprised of HPMA and acrylonitrile. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the reference, alone or in combination, especially in the absence of evidence to the contrary.

Claims 4, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the teachings of Leshchiner et al. with respect to claim 1, in further view of Chang et al.

The limitations of claim 1 are discussed above. Claim 4 recites more specific embodiments of the linear polymer such as being a copolymer of hydroxypropyl methacrylate and acrylonitrile (HPMA-AN) [*emphasis added*]. Claims 15 and 16 recite limitations to the solvent component of claim 1 wherein said component is ethanol, N-methyl-pyrrolidone or a combination of the two.

The teachings of Leshchiner are discussed above. Of particular note is that the, the second phase of the gel slurry composition of Leshchiner is taught and suggested as being composed of a synthetic polymer solution wherein the solvent is not water, but is water-miscible. Leshchiner also teaches and suggests that hydroxyalkyl methacrylate copolymers may be used to form the viscoelastic soluble polymer phase.

The teachings of Leshchiner are deficient such that the reference does not expressly teach the polymer solution being comprised of HPMA-AN or that the solvent is specifically ethanol.

The teachings of Chang which are provided above, remedy these deficiencies. In summary, Chang teaches and suggests the preparation of aqueous solution or dispersion compositions which are prepared through copolymerization of vinyl monomers such as HPMA and acrylonitrile compounds. Solvents which are used by the practiced invention include ethanol (see above).

Thus, it would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made to have modified the composition of Leshchiner et al. to provide an HPMA-AN solution in which to suspend the swollen gel particles, thereby arriving at the instantly claimed suspension. The ordinarily skilled artisan would have been motivated to do so not only in view of the general teachings of synthetic polymers (e.g. pHEMA copolymers)

provided by Leshchiner, but more importantly by the overlapping teachings of Chang which expand on the general teachings of Leshchiner in terms of preparing a copolymer-based solution. Chang demonstrates and further defines additional, functionally equivalent polyacrylic acid, polyacrylamide and hydroxyalkyl methacrylate components which may be used in the alternative to pHEMA, etc., in order to prepare copolymer solutions. Recognition of this overlap would have presented the ordinarily skilled artisan with a reasonably high expectation of successfully arriving at the instantly claimed invention. Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the combined references, alone or in combination, especially in the absence of evidence to the contrary.

All claims have been rejected; no claims are allowed.

#### CONCLUSION

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR

1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

#### **CORRESPONDENCE**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey T. Palenik whose telephone number is (571) 270-1966. The examiner can normally be reached on 7:30 am - 5:00 pm; M-F (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert A. Wax can be reached on (571) 272-0623. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrey T. Palenik/  
Examiner, Art Unit 1615

/Carlos A. Azpuru/  
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